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An add-on device for a screwdriver, a screwdriver, a kit of parts, and a screw

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Field of invention

The present invention relates to fasteners, in particular screws, and more particularly to an add-on device for a screwdriver. The invention further relates to a screwdriver having the add-on device, a kit of parts, and a screw for use with the add-on device.

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Background

Screws are a well-known type of fastener.

Known screws 100, 102, 114 as shown in Figures 1A to 1D generally have a threaded shank 108, 112, which can be tapered as shown in Figure 1A, or not, as shown in Figure 1B, and a head 104. The shank 108, 112 can have a pointed end or, when flat, is called a machine screw (shown in Figure 1B). The head 104 comes in different shapes and sizes and may be flush with the surface it is fixed into, or may protrude above the surface it is fixed. The head 104 of the screws either have a single slot for what's called a "flathead" screwdriver, or a slot in a cross shape for use with a "crosshead" screwdriver.

Screwdrivers 200 of either type are shown in Figure 2 (crosshead left, flathead right), and have an elongate shaft 202 with a handle 204 at one end for a user to grip and add different forces to, and a blade 206, the end of which is called a tip 208, at the other, of the flat or crosshead variety.

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Generally, screws are easy to use with a screwdriver. However, if something is hard to screw in to, or out of, two problems can arise. No matter how much torsion is applied to the handle by the user, the tip of any type of screwdriver can easily slide out of the screw head if not sufficient compression is applied. It is also important to select the right size of screwdriver for a screw.

For a flathead screwdriver, the tip can slip to the side, and even out, of the slot and a crosshead screwdriver has four short surfaces and so can have insufficient contact with the screw slot. Together this can put excessive pressure on the edges of the slot, damaging the edges of the slot and/or the surface below if the tip of the screwdriver which is under pressure contacts it. Damage to the slot may mean that the screw must be replaced.

Screwdrivers with magnetised tips are known. Screws 114 as shown in Figures 1C and 1D are known which have two or more protrusions 120 radially outward from the head which can be manually twisted, which may make the screw easier to rotate than using a screwdriver thanks to leverage.

The inventors have appreciated the need for a device which allows a screw to more easily be screwed into a surface. The inventors also have appreciated the need for a screw for use with such a device.

Summary of Invention

According to a first aspect of the invention, there is provided an add-on device for a screwdriver. The add-on device comprises: a securing means for securing the add-on device to a shaft of the screwdriver, in particular a collar configured to be secured around the shaft; at least two arms extending away from the securing

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means, so that in use the two arms extend towards a tip of the screwdriver. Each of the at least two arms comprises a first arm part secured to the securing means, and a second arm part which is movable relative to the first arm part; a protrusion at, or towards, a distal end of the second arm part, the protrusion configured to engage with a corresponding notch in a head of a screw; and tension mechanism configured to apply tension to the arm. In use, that is when the device is attached to a screwdriver, when the protrusion of each arm is engaged with the corresponding notch in the head of the screw, the tension applied to the arms by the corresponding tension mechanisms urges the tip of the screwdriver into a slot in the head of the screw.

Because each arm comprises two parts, one of which is secured to the securing means, which in turn is, in use, secured to a shaft of a screwdriver, when the projections engage the notches and the tensioning mechanisms apply tension to the respective arms, the arms exhibit a force pulling away from the tip, towards the handle of the screwdriver. In the following, the securing means will be referred to as a collar. As the arms are secured to the collar and therefore the shaft of the screwdriver, the tensioning force on the arms is translated into a force which urges/forces the screwdriver tip into the slot in the screw head.

In other words, by tensioning the arms which are secured to the collar and engaged with the notches on the screw head, a compressive force is exerted onto the screw head by the screwdriver, thereby securing the screwdriver in the slot by urging it toward the screw.

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Advantageously, this means the user does not have to use as much compression on the screwdriver to keep it in the slot, facilitating screwing of a screw, in particular if something is hard to screw in to, or out of.

It is noted that the second arm part, and the protrusion, may need to be at least capable of extending beyond the screwdriver tip – this depends on the relative position of notches and the depth of the slot in the screw head. For a normal screw with a slot of normal depth, the second arm part, including the projection, may be capable of extending, in use, beyond the tip so as to function best.

It is further noted that as set out above in the background section, the term “slot” with regards to a screw head may refer to a single slot for a flathead screwdriver, or a cross shaped slot for a crosshead screwdriver.

It is further noted that the term “distal” refers to a portion of the screwdriver which, in use, is towards the tip of the screwdriver. The term “radial” refers to a direction perpendicularly towards, and away from, the axis of the shaft of the screwdriver.

Optionally, [claim 2].

The add-on device having exactly three arms which are spaced substantially evenly apart allows for the arms to provide evenly distributed forces both to the screw head via the notches, but also the collar. Advantageously, this makes the device look attractive and function effectively due to good balance.

The add-on device having exactly four arms provides for evenly distributed forces both to the screw head and the collar. Advantageously, this makes the device aesthetically pleasing and well-balanced.

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Optionally, [claim 3]. The second arm part of each arm being pivotable relative to the corresponding first arm part allows the distal ends of the second arm parts to be movable towards and away from the shaft. This allows for the projections to easily be inserted into and out of the notches.

Optionally, [claim 4]. The fixing and guiding means allow for fixing and guiding of a tension mechanism, so that the tension force may be provided easily to the first and second arm parts.

Optionally, [claim 5]. Loops, holes and hook provide apertures for fixing and guiding a part of a tension mechanism. Advantageously, these types of fixing and guiding means are easily produced and sturdy.

Optionally, [claim 6]. The wire being fixed to the second arm part and a ratchet secured to the securing means allows for the ratchet to pull the wire in short stages in one directed, i.e. away from the tip of the screwdriver, and to temporarily hold it there, for further pulling of the wire or release.

Advantageously, this is a simple system which provides a tension mechanism and reduces the chance of slippage between the screw and the screwdriver. A ratchet allows for the tension force to be slowly and deliberately controlled.

Optionally, [claim 7]. The button allows for the ratchet to release the wire, thereby releasing the tension of the tension mechanism on the arm.

Advantageously, this allows for simple control of the tension and easy release of the tension, e.g. once a screw has been successfully screwed into a surface.

Optionally, [claim 8]. When not applying any external force, the spring pulls the arm away from the tip, i.e. in a proximal (which is the opposite of distal) direction.

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As such, the tension spring already provides tension, and the protrusions merely need to be engaged to the notches for the tension spring to provide tension.

Advantageously, this allows for easy removal of the protrusions from the notches, as merely pulling them from the notches results in the tension automatically being released.

Optionally, [claim 9]. A handle on the first part allows for easier handling of the device, in particular the separate arms. In particular in combination with the tensioning means, the handle allows the user to grip the respective arm and move it. Advantageously, this avoid the need to interact directly with any wires, or springs, or pivots, such as the pivot between the first and second arm parts.

Optionally, [claim 10]. The first arm part being pivotably secured to the securing means allows for the first arm part to be moved in a pivoting fashion relative to the securing means, e.g. the collar. Advantageously, this allows for easy movement of, e.g. the projection in a radial direction, making it easier to insert them into, or remove them from, the notches.

Optionally, [claim 11]. The second arm part being slidable relative to the corresponding first arm part allows axial movement, i.e. in a distal or proximal direction, of the second arm part relative to the first arm part. This in combination with the tension mechanism provides an easy to make alternative to a pivotable movement between arm parts, and avoids the potential downsides of pivots such as wearing out.

Optionally, [claim 12]. This feature means that when the second arm part is moved in a distal direction for engagement with the notches, a tension force is automatically exerted on the second arm part by the tension spring.

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Advantageously, this allows for easy build-up of tension force and a simple sliding system.

Optionally, [claim 13]. Getting the protrusions in and out of the notches may be slightly more difficult with slidable arms. By providing some ability to move the second arm part radially, advantageously assists with engaging with a notch.

Optionally, [claim 14]. Allowing for pivotable movement of the protrusion relative to the second arm part means that the protrusion can move radially towards and away from the notches. Advantageously, this assists with engaging with a notch.

Optionally, [claim 15]. A pin may be a separate component to the second arm part which can be welded to the second arm part. This secures good engagement of the pin with the notch. Advantageously, pins may also be easy to produce, and easily machined to a suitable shape to fit notches in a screw head.

Optionally, [claim 16]. The protrusion may be integrally formed from a distal end portion of the second arm part, i.e. by bending the distal end towards the tip of a screwdriver.

Optionally, [claim 17]. The magnetised protrusion will magnetically attract/be magnetically attracted to the metal screw head. Advantageously, this reduces the likelihood of the projections accidentally sliding out of the notches and increases the engagement between projections and notches.

Optimally, [claim 18]. Two parallel sides may best fit with two parallel sides of corresponding notches. Advantageously, two parallel sides improve the chance of the protrusion gripping the notch due to matching shapes.

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Optionally, [claim 19]. Providing a threaded hole in the collar provides for an aperture to receive a screw. Advantageously, it is easy to provide a threaded hole in a collar, and it is a good means for tightly securing the collar to the shaft. Further, different length screws may allow the device to engage with shafts of different diameters.

Providing a threaded screw, in particular multiple different threaded screws of different lengths, may allow for a variety of diameter shafts to be easily engaged and disengaged.

The threaded screw being a machine screw, i.e. a screw with a flat end, allows for the screw to engage the shaft well with a large end surface. Advantageously, this allows for sufficient force to be provided to securely hold the collar to the shaft.

Optionally, [claim 20]. This means, for example, that one arm may have a tensioning mechanism having a ratchet and a wire, and another may have a tension spring. Advantageously, this may allow for greater flexibility in designing the device.

Optionally, [claim 21]. The arms being connected means that if one of the arms is e.g. pulled towards the tip, or away from the tip, they move together.

Advantageously, this reduces the complexity in trying to deal with each arm individually.

According to a second aspect of the invention, there is provided a screwdriver comprising an add-on device according to the first aspect.

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According to a third aspect of the invention, there is provided a kit of parts comprising a screwdriver and an add-on device according to the first aspect.

According to a fourth aspect of the invention, there is provided a screw for use with an add-on device according to the first aspect, or a screwdriver according to the second aspect. The screw comprises an exposed head, which is configured to protrude above a surface the screw is fixed to in use, the head comprising: a slot in the head for engagement by a screwdriver, and at least two notches in the side of the head, each notch configured to be engaged by corresponding protrusions of the add-on device; and a threaded shaft.

Advantageously, by providing at least two notches, the sides of the head may be engaged by a device under tension to urge a screwdriver into the slot. Further, by providing notches rather than projections, disadvantages of the prior art screws with projections are mitigated, such as the projections getting caught on things, which the notches cannot.

Optionally, claim [25].

The screw having exactly three notches, which may be spaced substantially evenly apart allows an evenly distributed forces to be provided on the screw head via the notches. Advantageously, this makes the screw head look attractive and function effectively due to good balance.

The screw having exactly four notches provides for evenly distributed forces to the screw head. Advantageously, this makes the screw aesthetically pleasing and well-balanced.

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Two parallel sides of the notches may allow for easy insertion, in particular of a protrusion also having two parallel sides. Advantageously, providing two parallel sides improves the chance of the protrusion gripping the notch due to matching shapes.

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A method of use of any of the apparatuses may also be provided.

Brief description of drawings

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figures 1A to 1D are respectively side, perspective, plan, and side drawings of different known prior art screws;

Figure 2 is a side view of two prior art screwdrivers;

Figure 3 is a side view and a plan view of an embodiment of a screw;

Figure 4 is a side view of an embodiment of an add-on device for a screwdriver attached to a screwdriver; and

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Figure 5 is a side view of another embodiment of an add-on device for a screwdriver attached to a screwdriver.

Specific Description

Figures 1A to 1D and 2 have already been described above with regard to the background section, and reference is made to that description.

Figure 3 shows a screw 300 according to an embodiment of the present invention, having the usual components of a screw of a screw head 302, a slot 304 in the screw, and a threaded shaft 305. The screw 300 also has four

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notches 306 in the side of the screw head 302, radially distributed about the screw head.

In use, these notches 306 are engaged by projections of an add-on device as discussed in relation to Figures 4 and 5 below, whereas the slot 304 are engaged by the tip of a screwdriver. A tensioning force of the add-on device provides a force acting in the proximal direction on the notches 306, urging the screwdriver into the slot 304.

Although a tapered screw with a single slot is shown, it will be appreciated that crosshead screw may be provided, and a machine screw may be provided. Additionally, while four notches are shown, any suitable number of notches may be provided.

Figure 4 shows an add-on device 400 according to an embodiment of the present invention attached to a standard screwdriver 200 having a shaft 202, a handle 204, and a tip 208.

The add-on device comprises a collar 402 which is secured to the shaft 202 by a machine screw 404. Attached to the collar 402 is a ratchet 406. Further attached to the collar 402 is an arm 408 which extends towards the tip 208 of the screwdriver 200. The arm comprises a first arm part 410 which is pivotably (not shown) attached to the collar 402, and a second arm part 412. The second arm part 412 is pivotably connected to the first arm part 410 at pivot 414.

At its distal end, the second arm part 412 comprises a protrusion in the form of a pin 416, having two parallel sides, for engaging one of the notches 306 in a screw 300, such as that of Figure 3.

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On the inside surface, i.e. that facing the shaft 202, the first and second arm parts 410, 412 each have a loop 418 for receiving a wire 420 which extends into the ratchet.

A handle 422 is provided on the first arm part 410.

In use, to tighten a screw, it is located in the hole or on the surface and it is ensured there is no tension on the wire 418, so the arm 408 goes "limp". The tip 208 of the screwdriver 200 is put the screw head lightly to locate it and then, using the handle 422, move each pin 416 into a notch 306. Then by tightening the ratchet 406, tension is applied to the wire 420, pulling the arm 408 upwards (i.e. proximally) and forcing the screwdriver tip 208 into the notch or cross in the head of the screw, the wire 420 providing a tension mechanism and reducing the chance of slippage between the screw and screwdriver 200. By doing this for each arm of the add-on device, screw head is urged towards the tip, which reduces the chance the arm 408 will separate from the screw, and the user need not use as much compression on the screwdriver 200 as it is urged toward the screw.

In both Figures 4 and 5, only one arm shown for clarity, but it will be appreciated there may be any suitable number of arms with same features as described for the embodiments.

Instead of the wire 418 and the ratchet 406, a tension spring may be provided attached to the collar 402 and the second arm part 412.

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Figure 5 shows another embodiment of an add-on device 500 attached to a screwdriver 200. The only difference is on the tensioning device and the handle of the add-on device, as such only these difference will be described.

Instead of pivot 414, the second arm portion 412 is slidably attached to the first arm portion 410, which in turn is attached securely to the collar 402. Instead of a ratchet and wire, a tension spring 502 is provided which is attached to the second arm portion 412 and the collar 402. Additionally, the handle 422 is provided on the second arm portion 412.

In use, the second arm portion is slidably moved in a distal direction, creating tension on the tension spring 502. When the pin projection 416 locates a notch 306, the tension spring 502 acts as a tensioning mechanism urging the tip 208 towards the screw head.

Various modifications are apparent to those skilled in the art.

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CLAIMS

1. An add-on device for a screwdriver, comprising:

a securing means for securing the add-on device to a shaft of the screwdriver, the securing means optionally being a collar configured to be secured around the shaft;

at least two arms extending away from the securing means, so that in use the two arm extends towards a tip of the screwdriver,

each of the at least two arms comprising:

a first arm part secured to the securing means, and a second arm part which is movable relative to the first arm part;

a protrusion at, or towards, a distal end of the second arm part, the protrusion configured to engage with a corresponding notch in a head of a screw; and

a tension mechanism configured to apply tension to the arm,

wherein, in use, when the protrusion of each arm is engaged with the corresponding notch in the head of the screw, the tension applied to the arms by the corresponding tension mechanisms urges the tip of the screwdriver into a slot in the head of the screw.

2. An add-on device according to claim 1, wherein the add-on device comprises:

exactly three arms and the three arms are spaced substantially evenly apart from each other; or

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exactly four arms.

3. An add-on device according to claim 1 or 2, wherein the second arm part of each arm is pivotable relative to the corresponding first arm part.
4. An add-on device according to claim 3, wherein each arm part comprises, on an inside facing the shaft, a fixing and guiding means.
5. An add-on device according to claim 4, wherein the fixing and guiding means is at least one of: a loop; a hole; and a hook.
6. An add-on device according to claim 4 or 5, wherein the tensioning means comprises a ratchet secured to the securing means and a wire, the wire being secured to the fixing and guiding means of the second arm part and running into the ratchet.
7. An add-on device according to claim 6, further comprising a button to release tension from the wire.
8. An add-on device according to claim 4 or 5, wherein the tensioning means comprises a tension spring secured to the fixing and guiding means of the second arm part and connected to the securing means.
9. An add-on device according to any of the preceding claim, comprising a handle on the first arm part.
10. An add-on device according to any of the preceding claims, wherein the first arm part is pivotably secured to the securing means.
11. An add-on device according to claim 1, wherein the second arm part of each arm is slidable relative to the corresponding first arm part.

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12. An add-on device according to claim 11, wherein the tension mechanism comprises a tension spring attached to the securing means and the second arm part.
13. An add-on device according to claim 11 or 12, wherein a, in use, distal end of the second arm part of each arm is movable radially towards and away from the corresponding notch.
14. An add-on device according to claim 13, wherein the protrusion of each arm is pivotable relative to the second arm part.
15. An add-on device according to any preceding claim, wherein the protrusion of each arm comprises a pin.
16. An add-on device according to any preceding claim, wherein the protrusion of each arm comprises a bent portion of the, or a, distal end of the second arm part.
17. An add-on device according to any preceding claim, wherein the protrusion of each arm is magnetised.
18. An add-on device according to any preceding claim, wherein the protrusion of each arm comprises two parallel sides.
19. An add-on device according to any preceding claim, wherein the securing means is the collar, and the collar comprises a threaded hole for receiving a threaded screw; optionally, wherein the add-on device further comprises the threaded screw for securing the collar to the shaft of the screwdriver; and further optionally wherein the threaded screw is a machine screw.
20. An add-on device according to claim 1, wherein the tension mechanism of at least two of the arms is different from one another.

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21. An add-on device according to any preceding claim, wherein the arms are connected to one another so that if one arm is moved, the other arms move accordingly.
22. A screwdriver comprising an add-on device according to any preceding claim.
23. A kit of parts comprising a screwdriver and an add-on device according to any preceding claim.
24. A screw for use with an add-on device according to any of claims 1 to 21, or a screwdriver according to claim 22, comprising:
- an exposed head, which is configured to protrude above a surface the screw is fixed to in use, the head comprising:
- a slot in the head for engagement by a screwdriver, and
- at least two notches in the side of the head, each notch configured to be engaged by corresponding protrusions of the add-on device;
- and a threaded shaft.
25. A screw according to claim 24, comprising exactly three notches, or exactly four notches, and/or wherein each notch has parallel sides.

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Abstract

An add-on device for a screwdriver, a screwdriver, a kit of parts, and a screw

The present invention relates to fasteners, in particular screws. An add-on device 400 for a screwdriver 200 is provided. The add-on device 400 for a screwdriver is in particular for use with screws 300 having notches 306 in the screw head 302, for screwing into surfaces which are hard to screw into. The add-on device 400 has a securing means 402 for securing the add-on device to a shaft of the screwdriver, at least two arms 408 extending away from the securing means 402, and a protrusion 416 configured to engage with a corresponding notch in a head of a screw; and a tension mechanism 406, 420 configured to apply tension to the arm, so that the tension applied to the arms by the corresponding tension mechanisms urges the tip of the screwdriver into a slot in the head of the screw. A screwdriver 200 having the add-on device 400, a kit of parts, and a screw 300 for use with the add-on device 400 are also provided.

FIGURE 4

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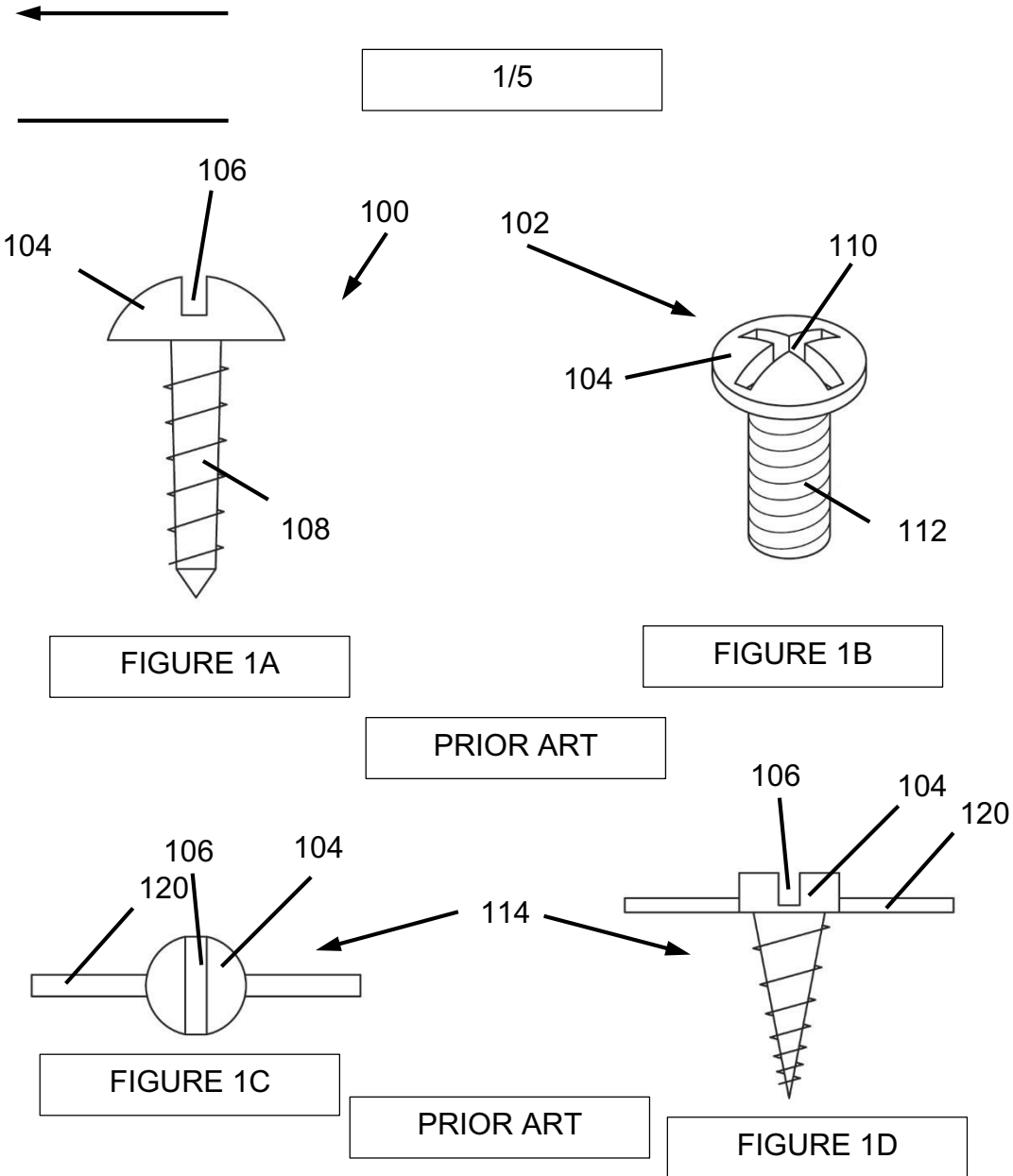
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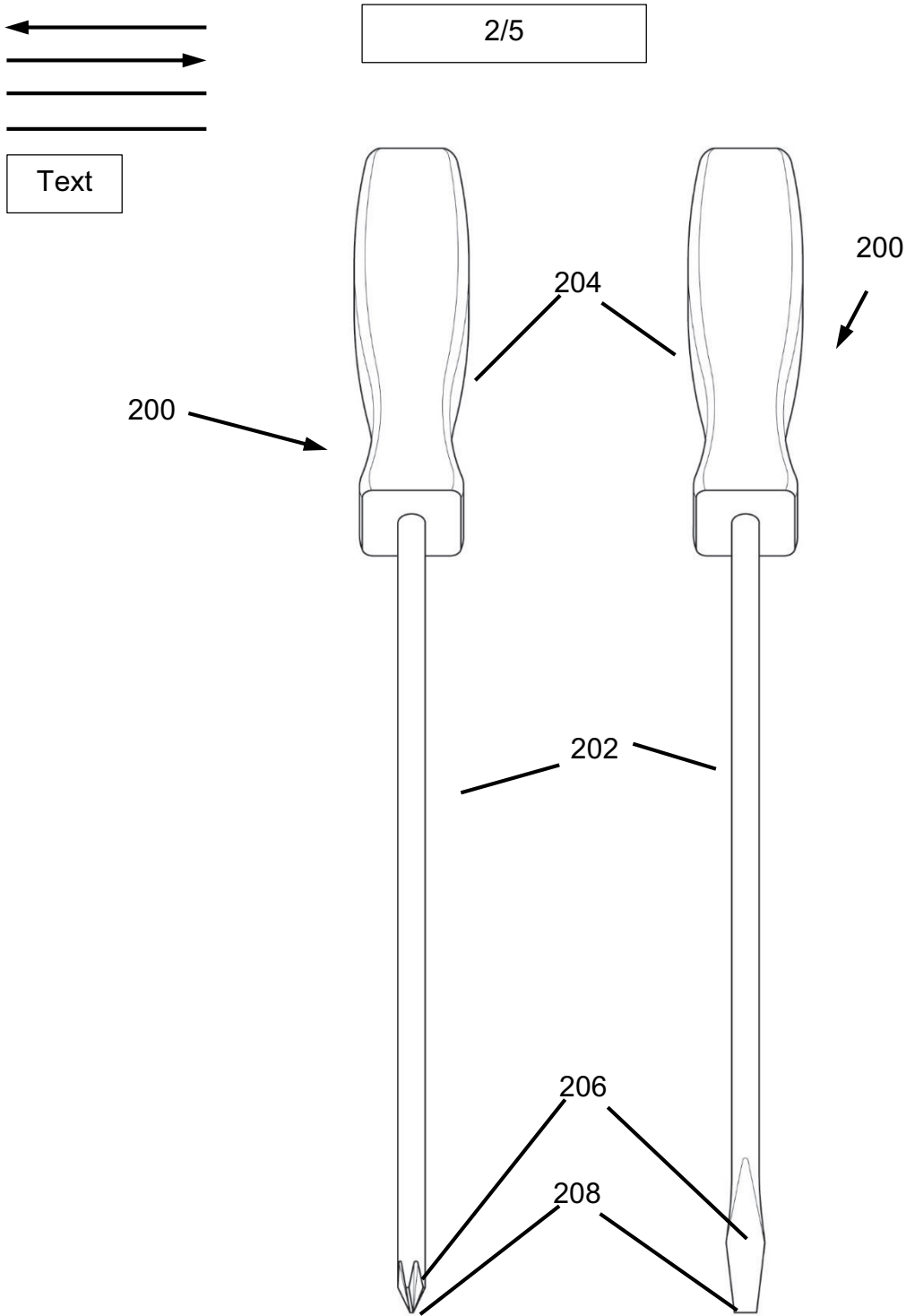
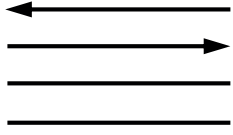


FIGURE 2
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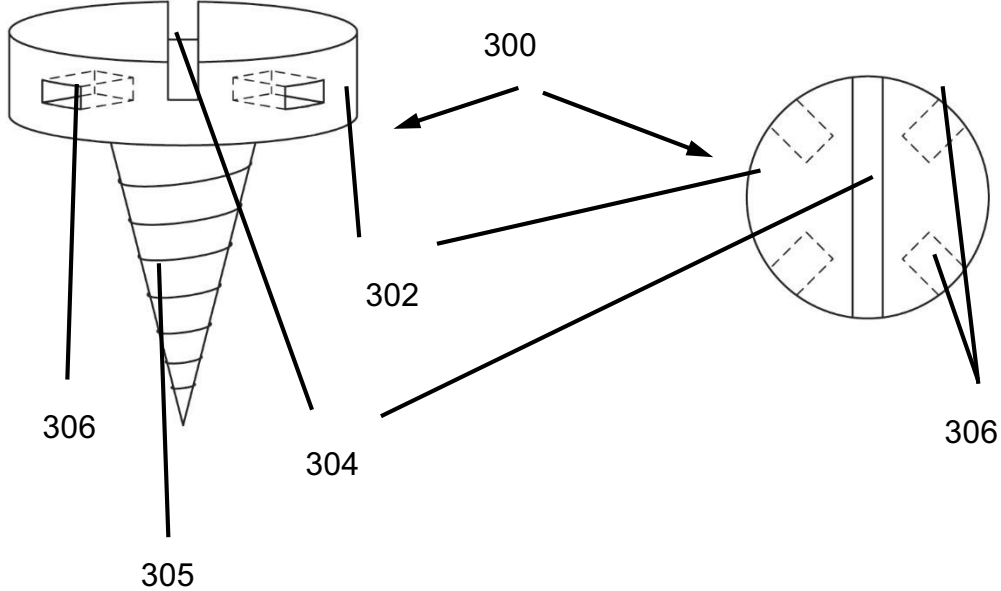
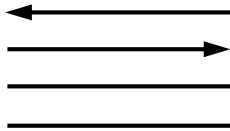


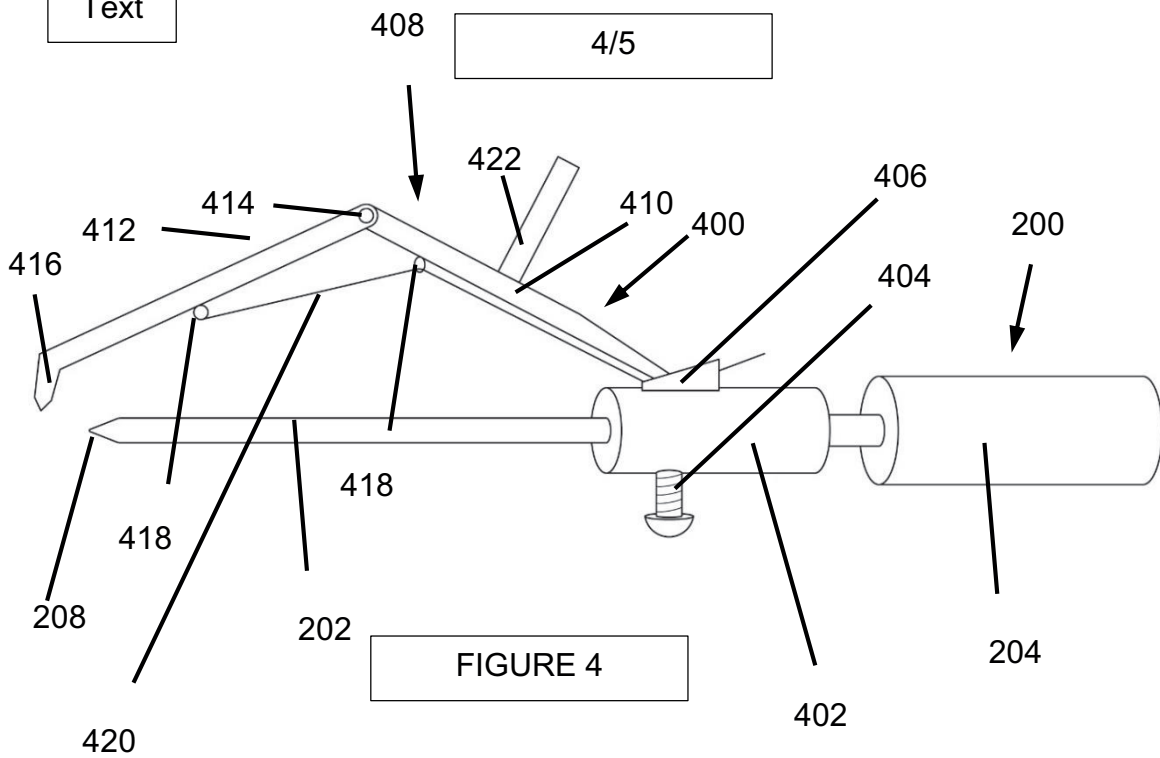
FIGURE 3

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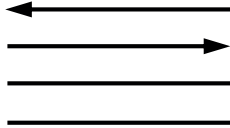


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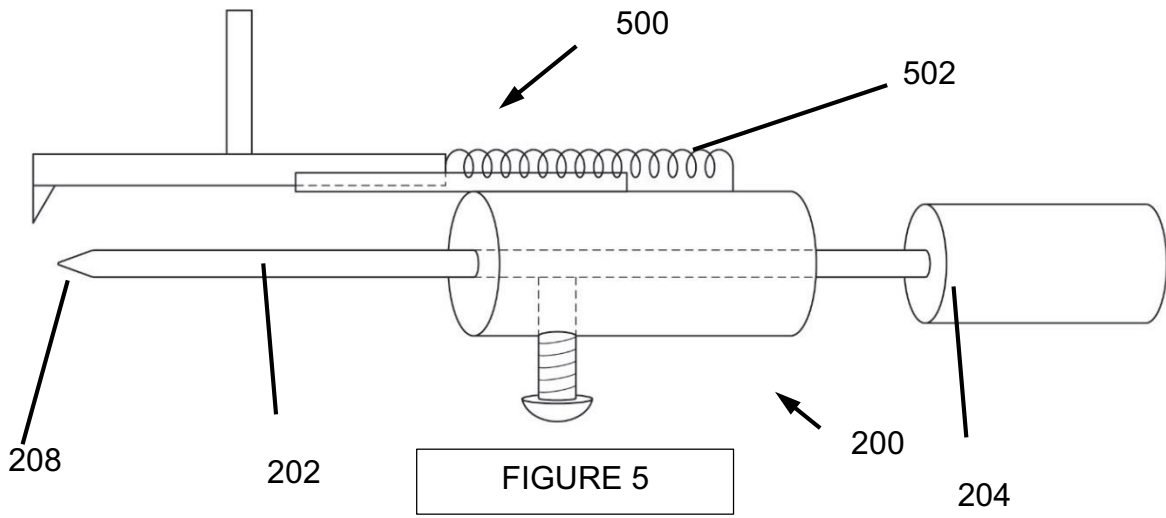


FIGURE 5
